PERFORMANCE OF GESTATING GILTS FED WHEAT VS SORGHUM GRAIN

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Story in Brief

A study was conducted to compare diets of hard red winter wheat vs sorghum grain for bred gilts. A total of 156 gilts were allotted from two seasons to the two dietary treatments. No significant differences were found between treatment means for litter size at birth, 21 days and 42 days; individual pig weight at birth, 21 days and 42 days; litter weight at birth, 21 days and 42 days; gestation gain and lactation loss. This study indicated that hard red winter wheat can be used successfully as a grain source for bred gilts.

(Key Words: Wheat, Sorghum Grain, Gestation, Swine.)

Introduction

Wheat in recent years has often been competitively priced with other cereal grains to justify its use as a livestock feed. Thus interest in feeding wheat is especially high in Oklahoma, a major wheat producing state with yields of 150 to 225 million bushels annually. Previous research conducted at Oklahoma State University (Luce et al., 1990) indicated that bred gilts fed hard red winter wheat had reduced reproduction performance as compared to those fed sorghum grain. Thus, this study was conducted to reevaluate wheat as an energy source in gilt gestation diets.

Materials and Methods

A total of 156 crossbred gilts mated to crossbred boars (Fall, 1989 and Spring, 1990) were randomly allotted within four lines to two dietary treatments.

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The four composite lines represented were as follows: 1) Unselected control; 2) Selection of boars for fast average daily gain under ad libitum conditions; 3) Selection of boars for fast average daily gain at 83% of predicted ad libitum; 4) Selection of boars for slow average daily gain under ad libitum conditions.

A sorghum grain-soybean meal diet and a hard red winter wheat-(TAM-105 variety) soybean meal diet was fed in both seasons (Table 1). The diets were formulated to be equal in lysine, calcium and phosphorus. Metabolizable energy and other nutrients were similar in both diets.

Table 1. Composition of experimental diets.

Ingredients, %	Gestation diets		Lactation diet
	Sorghum	Wheat	
Sorghum grain	81.20	---	77.80
Wheat, hard red winter	---	85.30	---
Soybean meal, 44% CP	14.40	10.40	17.80
Dicalcium phosphate	1.75	1.55	1.70
Calcium carbonate	1.05	1.15	1.10
Salt	.35	.35	.35
Vitamin-trace mineral mix[a]	.25	.25	.25
Chlorotetracycline	1.00	1.00	1.00
Total	100.00	100.00	100.00
Calculated composition			
Metabolizable energy, kcal/lb	1370	1411	1371
Protein, %	13.65	14.98	14.83
Lysine, %	.62	.62	.72
Calcium, %	.85	.85	.85
Phosphorus, %	.65	.65	.65

[a]Supplied 800,000 IU Vitamin A, 80,000 IU Vitamin D, 3,400 IU Vitamin E, 4,000 mg d-pantothenic acid, 5,400 mg niacin, 800 mg riboflavin, 660 mg menadione, 4mg Vitamin B12, 80,000 mg choline chloride, 18 mg selenium, 5 g manganese, 18 g zinc, 18 g iron, 2 g copper and 36 mg iodine per lb of premix.

[b]Supplied 200 g chlorotetracycline per ton of feed.

In all seasons, gilts were housed outside in dirt lots during gestation and group fed five pounds of feed per head per day. At day 110 of pregnancy, gilts were moved to individual confinement farrowing crates and litters were penned separately until weaning at 42 days. Beginning at day 110, all gilts were fed a common lactation diet (Table 1) at a rate of 4.5 lb/day until farrowing. After farrowing, the gilts were self-fed the lactation diet for the duration of the 42 day lactation. Pigs had access to creep feed from 21 to 42 days of age.

Results and Discussion

Dietary treatment effect on litter size at birth, 21 days and 42 days; individual pig weight at birth, 21 and 42 days; litter weight at birth, 21 days and 42 days and gestation gain and lactation loss are presented in Table 2.

Table 2. Effect of grain source on reproductive performance of gestating gilts.[a]

Item	Sorghum grain gestation diet	Wheat gestation diet
No. litters	74	82
Litter size		
Birth	9.64	9.51
21 days[b]	8.08	7.79
42 days[b]	7.89	7.76
Pig weight, lb		
Birth	3.38	3.31
21 days	11.56	11.55
42 days	22.19	22.37
Litter weight, lb		
Birth	32.25	31.02
21 days[b]	92.09	88.61
42 days[b]	173.10	171.11
Gestation gain, lb	113.31	103.64
Lactation loss, lb	-2.61	-4.49

[a]No significant differences between treatment means.
[b]Significant diet x line interaction. See Table 3.

No significant differences between treatment means were found for any of the traits measured, but diet x line interactions were observed for litter size at 21 days ($P<.04$), litter size at 42 days ($P<.05$) and litter weight at 42 days ($P<.02$). Thus, these means are presented within line in Table 3.

Decreases ($P<.05$) in litter size at 42 days and litter weight at 21 and 42 days were observed for gilts fed sorghum grain diets as compared to those fed wheat in line 1. In contrast, litter weight at 21 and 42 days was less ($P<.05$) for gilts fed wheat in line 2 as compared to gilts fed sorghum grain. In line 3, litter size and weight at 42 days was also smaller ($P<.05$) for gilts fed wheat as compared to those fed sorghum grain. No significant differences were noted between gilts fed sorghum grain and wheat in line 4.

These trials indicated that hard red winter wheat can be used very successfully as a grain source for bred gilts, but specific recommendations may depend on genetic type of the sow herd. Results for line 1 were in contrast to research reported by Luce et al. (1990) when bred gilts fed TAM 101-variety hard red winter wheat had decreased reproductive performance as measured by litter size at birth and weaning, litter weight at birth and weaning and individual pig weights at weaning as compared to those gilts fed sorghum grain. The differences between these two experiments could be because of differences in wheat varieties or quality of the wheat used.

It should be noted that the wheat based diet contained 80 lb less soybean meal per ton than the sorghum grain based diet to achieve an aqual dietary lysine content. This 28% reduction in soybean meal should be considered when comparing the cost of wheat vs sorghum grain based sow diets.

Table 3. The effect of grain source on performance of gestating gilts within line.

	Line[a]							
	1		2		3		4	
Item	Sorghum	Wheat	Sorghum	Wheat	Sorghum	Wheat	Sorghum	Wheat
Litter size								
21 days	7.29	8.55	8.16	7.39	8.88[b]	7.34[c]	7.99	7.90
42 days	7.04[b]	8.47[c]	8.08	7.28	8.62	7.49	7.80	7.79
Litter weight, lb								
21 days	85.59[b]	101.34[c]	96.05[b]	79.66[c]	98.55[b]	83.70[c]	88.17	89.74
42 days	162.40[b]	197.69[c]	182.18[b]	153.16[c]	180.46	167.25	167.36	166.34

[a]1 = Unselected control. 2 = Selected for fast average daily gain under ad libitum conditions. 3 = Selected for fast average daily gain at 83% of predicted ad libitum. 4 = Selected for slow average daily gain under ad libitum conditions.

[b,c]Means in a row with different superscript within line differ ($P < .05$).

Literature Cited

Luce, W.G., et al. 1990. Wheat vs sorghum grain for gestating gilts. Okla. Exp. Sta. Res. Rpt. MP-129:273.